

REMARKS/ARGUMENT

The claims have been extensively revised to particularly point out and distinctly claim the invention. To this end, claims 1, 2, 4, 6, 10, 11, 12, 16 and 17 have been cancelled; claims 3, 5, 7, 8, 9, 13, 14, 15, and 18 have been amended; and claims 19 to 28 have been added, of which claims 19-21 and 24 to 26 are independent claims. The claimed invention expressed in the amended and newly added claims concerns a method, system and computer program product that relates to volume visualization of volumetric data. As claimed, the volumetric data is obtained that is segmented to identify a predetermined feature. The invention, as claimed, identifies voxels defining the surface of the feature and uses the defined surface as a reference surface assigning to one of voxels within the defined surface and voxels without the defined surface a value indicative of the distance of each of the voxels from the defined surface. Then, the 3D volume data is volume rendered to create a 2D image of the 3D volume data. A user interface is provided to enable a user to interactively select a voxel distance of a voxel to the reference surface. The volume rendering is controlled to create a 2D image of the 3D volume data wherein the voxels in the 2D image are all equidistant from the reference surface and thereby constitute a surface parallel to the reference surface spaced therefrom by the selected voxel distance. An output of the 2D image is created from the volume rendering that is indicative of the surface parallel to the reference surface and spaced therefrom by the selected voxel distance. The output of the volume rendering is visualized as a 2D image.

This enables, for example, to use the surface of an organ, such as a lung, as a reference surface despite the fact that the reference surface defines an enclosed geometrical figure. The invention enables the volume rendering of the data to create and visualize an inner layer of the organ parallels the enclosed geometrical figure of the organ surface. The inner parallel layer spaced by a given distance from the reference surface. This enables viewing a region of the organ even though it cuts across a plurality of slices of the scanning, MRI or CT. By simply changing the given distance, such as, rolling the wheel of a wheel computer mouse, it is possible to easily scroll between multiple inner parallel layers of the organ.

Subject matter of Gering - DI

Document DI discloses a computerized surgical assistant which allows fusing of preoperative datasets and rendering them in an interactive 3D graphics environment (compare page 19).

Volumetric data can be segmented semi-automatically. 3D surface models can be generated and visualized in a 3D view along with reformatted slices, and the slices can selectively dip away portions of some models, such as the skin, to reveal other unclipped models beneath, such as a tumor. Distances, angles, surface areas and volumes of structures can be measured quantitatively (compare page 20, first paragraph).

Subject matter of Gillick et al - D2

D2 relates to a computer mouse having a roller which implements a scrolling function for computer programs. Thereby, the object of the D2 disclosure is to improve performance of Windows and similar operating systems and programs by simplifying and accelerating sub-functions performed by mice, in particular the scrolling function (compare abstract, column 2, lines 21-24).

Patentability of the current patent application over the prior art

The independent claims are new, unobvious and inventive over document D1.

As already mentioned above, D1 discloses the visualization of surface model along with reformatted slices, whereby it is possible to clip away portions of some models in order to reveal unclipped models beneath. Besides the display of 3D views of surface models it is possible to visualize slices that are visible in the 3D view and display them as cross-sections.

In contrast, the independent claims of the present invention create parallel surfaces to the surface of a feature, such as a body organ, a lung, which is an irregular geometric figure. The parallel surfaces are shown in 2D and enable a look at the volume data in a new and unique manner, not possible in the prior art cited and applied of record. In addition, the invention makes it possible to scroll from one parallel surface to another easily and thereby examine the volume of the selected feature using 2D images. This is not possible using the prior art in the manner described or sought to be cobbled together.

Document D1 does not render obvious this solution to the person skilled in the art. For example as described in section 1.3.1 of D1, it is only possible to use two-dimensional views of a respective 3D view in terms of a cross-section which comprises a cross-section of an anatomical image in grayscale, as well as cross-section of a volumetric form of a 3D surface model overlaid in color. However, as mentioned above the goal of the present patent application is not to provide a simple cross-section, but to provide a 2D projection of an inner layer of an object, with the inner layer of the object being parallel to the outer layer

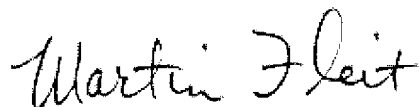
(reference surface) of the object with the reference surface not necessarily being planar. This is not possible at all using D1, which at best can only show a two-dimensional image that is a cross-section i.e. a planar slice through a three-dimensional landscape. Therefore, D1 does not teach the subject matter of claim 1.

With respect to a combination of D1 and D2, this also would not teach the invention to someone skilled in the art, since D2 only discloses a computer mouse having a roller which implements a scrolling function for computer programs.

In light of the foregoing remarks, this application should be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time, time sufficient, to effect a timely response, and shortages in this or other fees, be charged, or any overpayment in fees be credited, to the Deposit Account of the undersigned, Account No. 500601 (Docket no. 7390-X04-030)

Respectfully submitted,

A handwritten signature in black ink that reads "Martin Fleit". The signature is written in a cursive, flowing style.

Martin Fleit, Reg. #16,900

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